

Faculty of Science Course Syllabus
Department of Earth Sciences
ERTH/GEOG 1060 Natural Disasters
Winter 2019

Professor: Dr. John Gosse	John.Gosse@dal.ca LSC Oceanography Wing Rm. 4616 Wednesday 9:00-11:00, or by appointment for matters pertaining to lecture questions, exams, and accessibility
Instructor: Dr. Jillian Bambrick-Banks	jill.banks@dal.ca by appointment for questions pertaining to homework quizzes
Teaching Assistant: Ms. Sydney Stashin	Sydney.Stashin@Dal.Ca by appointment for questions pertaining to pop quizzes and lecture material

Lectures: 10:05-11:25 Tuesdays and Thursdays Kenneth C Rowe Management Bldg Room 1028

Course Description

Earthquakes, meteorite impacts, rapid climate change, volcanic eruptions, hurricanes, landslides, solar flares, and floods are natural hazards that affect our economy, public policy, and safety. Where, why and how frequently do natural disasters occur? Are predictions possible? This course, aimed at the non-specialist, investigates these intriguing questions. Excerpts from various media, in conjunction with lectures and discussions, are used to study the causes, consequences and perceptions of natural hazards. Global and Canadian examples of recent and noteworthy disasters are used to assess local risk and track real-time events worldwide. The course will provide a balanced treatment of the subject so science, arts, and professional school undergraduates can gain practical experience and knowledge about how we study natural hazards and attempt to minimize loss of life and property.

Course Text: **STRONGLY RECOMMENDED** but not required, available in digital format:
Patrick Abbott and Claire Samson, 2017, Natural Disasters, 4th Canadian Ed., McGraw Hill ISBN 9781259458095.

In previous years we have required a textbook. This year we are not requiring this textbook but we are STRONGLY recommending it. The textbook will provide additional definitions and many more examples than what we have time to review during lectures. To get access to the digital version of the textbook contact the Dalhousie Bookstore. There is also a new Patrick Abbott, 2020, Natural Disasters, 11th American Ed. McGraw Hill version. While it does not contain some of the Canadian content we will discuss during the course, it provides more updated examples of natural disasters globally than the 4th Canadian Edition. Either is fine and will cost around \$100.

Software: You will need access to [GoogleEarth](https://www.google.com/earth/) or GoogleEarthPro to make measurements of natural hazards or disasters. Precision may be reduced on a small monitor such as a smart phone, so you should have access on a larger monitor.

University Prerequisites: Open attitude toward science

All course information available from Brightspace <https://dal.brightspace.com/d2l/home>

Learning Objectives

Obj 1. The student will explain the triggers, conditions, basic dynamics, and energy sources that drive each natural hazard studied

Condition – Given a geophysical or climatic hazardous process

Behaviour – The student will distinguish the elements of the hazards system and the forces and energy that control magnitude and frequency

Criterion – The student will correctly explain the drivers

Obj 2. The student will calculate magnitude, frequency, and recurrence interval for a given hazard

Condition – Given data for a hazardous process

Behaviour – The student will evaluate rates, energies, and probabilities of a given hazard magnitude, including any unit conversions

Criterion – The values calculated will be correct

Obj 3. The student will recall different approaches to monitor and predict natural hazards and forecast looming natural disasters

Condition – Given a natural hazard

Behaviour – The student will explain current approaches used to obtain information to generate forecasts and predictions for each natural hazard

Criterion – The student can devise a complete and valid strategy to make a prediction for a looming disaster

Obj 4. The student will acquire an appreciation for the financial and human risks for each hazard

Condition – Given case histories of natural disasters

Behaviour – The student will compare different disasters of given hazard types, will compare the significance of difference hazards, and explore what controls vulnerability to the hazard

Criterion – The student uses specific examples from past natural disasters to appraise how location, wealth, and population density control damage and fatality level

Obj 5. The student will assess the potential for a natural hazard

Condition – Given a physical address on the planet Earth

Behaviour – The student will consider the probability of any natural hazard or hazardous condition

Criterion – The qualitative assessment will be supported with geological, historical, statistical, and modeling evidence

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D	(50-54)
A (85-89)	B (73-76)	C (60-64)	F	(<50)
A- (80-84)	B- (70-72)	C- (55-59)		

Course Assessment

Mid Term Test (1 test, required)	30%
Pop quizzes (minimum of five quizzes, lowest score dropped)	10%
Homeworks (lowest score dropped)	25%
Final Exam (cumulative)	<u>35%</u>
Total	100%

1. The **mid-term test, homework assignments, and final exam** are mandatory.
2. The BBL server portal for **homework assignments** will close at 11:59 pm on the due date for the assignment. The homework assignment with the lowest score, or that is not submitted owing to a short-term or long-term absence, will be dropped. We will take a weighted average of the four other homework assignments. Please provide a Student Declaration of Absence for the one homework you missed. You will be given at least one week to complete each homework. You should complete the homework in the first few days, to prevent missing the deadline in the case of an unexpected short-term absence. If you do not submit a second homework, then discuss the absence with the course Instructor in charge of homeworks, who will decide if the homework will be re-opened for completion at a later date.
3. **Pop quizzes** encourage discussion during lectures, and help us evaluate **class participation**. There will be at least 5 pop quizzes, but likely more. Although you are encouraged to discuss the pop quiz with your classmates, the submitted written answer must be your own. We will drop the quiz with the lowest score before taking the mean score. In other words, a single missed quiz owing to “short-term absence” or “long term absence” will be dropped. However, the second missed quiz will receive a score of zero unless a **Student Declaration of Absence** is submitted within one week of the quiz. Submitting a pop quiz for someone else may result in a failure in the entire course.
4. Plagiarism, including cheating during the quizzes, tests, or exams, will result in a zero grade for the test or homework, and may result in a failure in the entire course. No electronic communication equipment, calculators, or other electronic devices are permitted during tests or exams.
5. There are no field trips or laboratories in this course.
6. **The mid-term test date is fixed** and the **final exam time will be announced in February**. In the case of a valid short-term absence, you must contact Dr. Gosse within two days of the mid-term test. A **Student Declaration of short-term Absence** should be cleared with Dr. Gosse (via email) prior to the original test date. For students who have contacted Dr. Gosse on or before the test day, there will be a makeup exam. Students who are accepted to take the make-up test must contact Dr. Gosse for the time and location of the test. For a long-term absence, discuss this with Dr. Gosse at the earliest convenience. If you are an athlete and have a conflict of scheduling between the mid-term test and an athletic event in which you are participating, please discuss the conflict with Dr. Gosse as soon as possible before the test. No accommodation will be provided for athletic events conflicting with the Final Exam.

ERTH/GEOG 1060 Tentative Schedule

(readings are from: Abbott & Samson, *Natural Disasters*, 4th can. ed.)

Mid-Term Test date is fixed. Other aspects of this schedule are tentative. They may change to allow us to examine disasters that occur during the semester or to accommodate guest lecturers.

Lec #	Date (mm-dd)	Topic	Read before class
1	01-08T	Course overview, syllabus, how to achieve an A grade	
2	01-10R	Natural Hazards Concepts	Ch. 1
3	01-15T	Predictive Models and Trends <i>Homework-Practise with Google Earth (not graded)</i>	Ch. 1
4	01-17R	Energy of Natural Hazards-Beer Experiment	Ch. 2
5	01-22T	Plate Tectonics	Ch. 2
6	01-24R	Plate Tectonics and Earthquakes <i>Homework 1 Begins</i>	Ch. 3
7	01-29T	Seismology-Wave Physics	Ch. 3
8	01-31R	EQ risks, prediction, mitigation <i>Homework 2 Begins, Homework 1 Ends</i>	Ch. 3
9	02-05T	Paleoseismology-California, Nepal, Canada	Ch. 4
10	02-07R	Volcanism: the chemistry of magma	Ch. 5
11	02-12T	Volcanic risks, prediction- Iceland and Chile <i>Homework 2 Ends</i>	Ch. 6
-	02-14R	Mid term exam (in class, 10:05-11:25)	Rowe, Rm 1028
-	02-19T	<i>Study Break</i>	Ch. 8
-	02-21R	<i>Study Break</i>	Ch. 8
12	02-26T	Tsunami dynamics, causes, and prediction <i>Homework 3 Begins</i>	Ch. 7
13	02-28R	Tsunami risks around the world	Ch. 7
14	03-05T	Landslides and Tsunami-Norway and Atlantic Canada <i>Homework 3 Ends</i>	Ch. 13
15	03-07R	Severe weather-Winter Storms	Ch. 9
16	03-12T	Severe weather-Tornadoes	Ch. 9
17	03-14R	Hurricanes-dynamics-Acid Bottle Experiment <i>Homework 4 Begins</i>	Ch. 10
18	03-19T	Hurricanes-Prediction	Ch. 10
19	03-21R	Hurricanes-Canada, and world <i>Homework 4 Ends</i>	Ch. 10
20	03-26T	River and Delta Flooding-Mechanics <i>Homework 5 Begins</i>	Ch. 11
21	03-28R	River Flooding-Prediction and Mitigation	Ch. 11
22	04-02T	Near Earth Objects and Cosmic Rays <i>Homework 5 Ends</i>	Ch. 14
23	04-04R	How does climate change affect Natural Hazards?/REVIEW	Ch. 8
	TBA	Final exam (cumulative) April 2019	Dalplex

Note regarding the Final Exam for EARTH/GEOG 1060:

The date and time for the final exam will be determined by the Registrar and announced by about February 1. In some years the final exam has been on the last day of Exam Week. It is the policy of the Department of Earth Sciences that only **one** Final Exam will be scheduled for large classes (i.e. there will be no earlier or later alternative dates for exams). The final exam is mandatory. **Because we do not know when the final exam will be until after the February 1 announcement, if you must book flights before February we recommend that you plan to travel after April 26, 2019.** Leaving campus early for work or to go home is not a valid reason to miss a final exam.

ERTH/GEOG 1060 Earthquakes, Volcanoes, and other Natural Disasters**University Policies and Statements**

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: <http://www.dal.ca/cultureofrespect.html>

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Missed or Late Academic Requirements due to Student Absence (policy)

https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html

Student Advocacy: <https://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Safety

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>